8.3 Confidence Interval for $\mu$

Conditions for a One-Sample $t$ Interval for $\mu$:

- Data is from a random sample (and is representative of population)
- 10% Condition: $n \leq 10\% N$ (or trials are independent such as with sampling with replacement)

- Normal/Large Sample:
  - $n \geq 30$ or,
  - population is approx Normal
  - if $n < 30$, then the sample distribution is NOT strongly skewed and has no outliers

You MUST sketch this!

- Dotplot or Histogram or Boxplot or Normal Probability Plot
Calculate the confidence interval:

\[ \bar{X} \pm (\text{Critical Value}) \cdot (\text{Standard deviation of statistic}) \]

If \( \sigma \) is known

\[ \bar{X} \pm Z^* \cdot \frac{\sigma}{\sqrt{n}} \]

If \( \sigma \) is unknown

\[ \bar{X} \pm t^* \cdot \frac{S_x}{\sqrt{n}} \]
63. \[ SE = 19.03 \]
\[ n = 23 \]

\[ a. \quad S_x = 91.26 \text{cm} \quad \sqrt{23} \cdot 19.03 = \frac{S_x}{\sqrt{23}} \cdot \sqrt{23} \]

\[ b. \quad 61.55 \pm 19.03 \]
\[ \overline{x} \pm t^*SE \quad n = 23 \quad \text{Confidence Level} = \, ? \]
\[ 1 \quad \text{tcdf}(-1.1, 22) = 0.67 \]
68. b. \[ CI = \bar{X} \pm ME \]

\[ S_x \text{ will change } \uparrow \]
\[ n \uparrow \text{ by 1} \]
\[ 0 \]

So, CI will get wider and shifted to right.